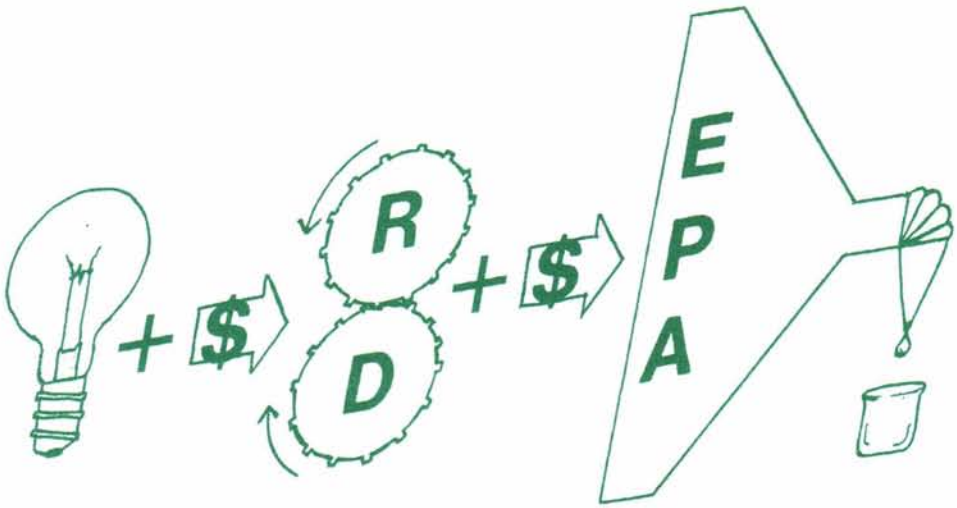
The Process Behind Good Chemistry



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Tough jobs are simplified when you have the right tools. The right tools come in many forms, but they certainly don't come easy. Take a second and think about the chemical tools used to control pests on the golf course. What does it take to bring new chemistry to the turf management industry and also maintain the older, but still reliable products? Does a specific process exist, or are products discovered by accident? What are the implications of the new Food Quality Protection Act (FQPA)

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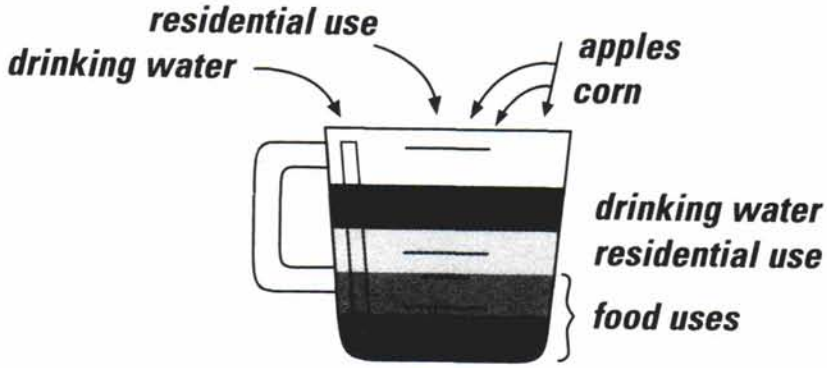
legislation? To understand the answers to these questions, we first must look at the societal, safety, environmental and economic circumstances that influence the decision to bring or keep a particular type of product on the market.

Pesticide manufacturers are constantly searching for newer, more effective and safer products. In an effort to find potential agricultural or horticultural products, the industry intensively screens hundreds of thousands of molecules each year. Even with the intensive screening process, fewer than one in 20,000 products developed makes it to the market.[2] Although rumor has it that some products are discovered by "accident," today's competitive environment requires the use of high-tech screening processes that do not allow for mistakes. Upon discovering a potential product, the manufacturer must first satisfy a slate of conditions set by the Environmental Protection Agency (EPA) and next justify the economic feasibility of the potential product. The EPA conditions are valid safeguards that protect us, not only as handlers and applicators of products, but also as members of the general public. More importantly, the safeguards give the assurance that someone is watching our interests as family guardians.



Aggregate Risk Cup

Human safety issues are at the top of the list when a product undergoes consideration for registration. Potential human exposure is determined and then evaluated through a procedure called a "risk cup" analysis.

Testing produces an average daily intake, or ADI, for each specific outlet or crop proposed for a product. Think of the ADI, or safe potential exposure, for each outlet or crop as filling the risk cup. When the risk cup becomes full of ADI points, the manufacturer can no longer seek registrations for the product on further application outlets.

The nation's food and pesticide regulations have become even more protective with the passage of the FQPA in 1996. Think of the risk cup again. This "cup" contains the amount of pesticide residue that a person can be exposed to daily without affecting health. The risk cup must make room not only for residues on food, but also from residues found

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in drinking water, produced in and around the home, and encountered on lawns, gardens and public spaces, such as parks, rights-of-way and golf courses. Safeguards for infants and children, as well as other sensitive population subgroups, have been expanded.[2] The new legislation also requires that where two or more pesticides act on human health in the same manner, they must share a common risk cup. Therefore, the risk cup has become smaller, resulting in potentially fewer pesticides and/or pesticide uses. While the FQPA makes it more difficult to register or maintain products in the market, we can be assured that the products that receive approval have been thoroughly reviewed by the EPA and pose a reasonable certainty of no harm to people or the environment.

To obtain federal registration, then, rigorous research into environmental issues including water quality, product degradation, the analysis of the degradates and effects on soil microbiology are necessary. Ecological research involving non-target effects on native and endangered species is also part of the process. Pesticide registration decisions are based primarily on the EPA's evaluation of the test data provided by manufacturers. Some 120 or more tests may be required.[1]

Established products will also be, at some point in time, subject to review by the EPA. This review process requires manufacturers to reexamine the older products' chemical components, reassess their risk in light of the risk cup and evaluate the products' ability to meet the new legislative standards. Expenditures related to this re-registration review are significant. This costly process has already resulted in the elimination or limitation of the number of tools available for superintendents. Organophosphate and carbamate insecticides are among the first of the products now undergoing review by the EPA as a result of the new legislation. A grassroots initiative is presently encouraging the EPA not to rush to judgment on invaluable pesticide products and use preliminary and incomplete information. Rather, this grassroots campaign calls for use of real-world data and sound science as the basis for the EPA's analysis.

In addition to the EPA's strict requirements, the economics of product development also affect the process. The research needed to bring a particular product to market can take from six to ten years and cost the manufacturer $50 million or more.[2] You may wonder, why are the large pesticide manufacturers also in the pharmaceutical business? The answer is research. With the emergence of biotechnology, the synergy between pharmaceutical and agricultural chemical research platforms provides the manufacturers with exciting new possibilities, skills and resources that enhance competitive position in the marketplace.

What are the fruits of the extensive research and registration efforts put forth by the chemical manufacturers? New, user-friendly products and the continued availability of reliable, time-tested chemicals that provide excellent alternatives for pest control in the turf environment.

[1] *Lawn Care Chemicals: What Consumers Should Know. American Council on Science and Health, 1992.*
[2] *And Now, The Good News. American Crop Protection Association, 1997.*